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**GB A 2142348**  
**GB A 2135329**

**GB A 2132643**  
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**GB A 2110723**  
**GB A 2110722**

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(58) Field of search

**D1B**

(54) **Dye compositions**

(57) A dye composition for treating hair contains a cationic surfactant, a direct dye and a liquid vehicle. The colour intensity of the dye is increased by the use of cationic surfactants. Amphoteric surfactants are incorporated to increase foam producing ability without reducing to any great extent the dyeing capability.

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## SPECIFICATION

## Compositions

- 5 The present invention relates to dye compositions useful in dyeing natural fibres, and in particular for dyeing human hair. 5

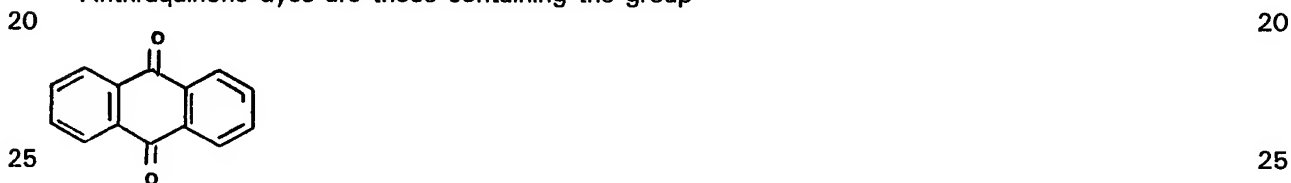
Direct dyes are commonly used to colour fibrous materials, for instance human hair, for a limited time and may be useful when repeated changes in colour are required. However, direct dyes often impart a low colour intensity to a substrate and safety considerations may prevent  
10 the use of more concentrated compositions. 10

It has now been found that the colour intensity of direct dyes deposited onto human hair can be increased by the use of cationic surfactants, the surfactants facilitating higher deposition of dye onto the hair.

- Accordingly, the present invention provides a dye composition for treating hair, comprising a cationic surfactant, a direct dye and a liquid vehicle. Preferably the liquid vehicle is an aqueous vehicle. 15 15

Examples of direct dyes include anthraquinone, azo, nitro, basic, triarylmethane, or disperse dyes or any combination thereof.

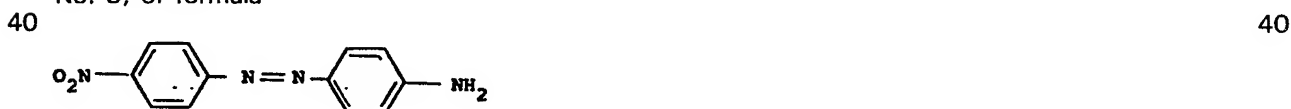
Anthraquinone dyes are those containing the group



and a particular example is Disperse Blue No. 1, of formula



Azo dyes are those containing the  $-N=N-$  group, and a particular example is Disperse Orange No. 3, of formula



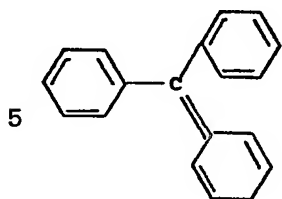
- 45 Nitro dyes are those containing the  $-NO_2$  group, and a particular example is 2 nitro-p-phenylene diamine, of formula 45



- 55 Basic dyes are those containing coloured cations, and a particular example is Basic Yellow 9, of formula 55

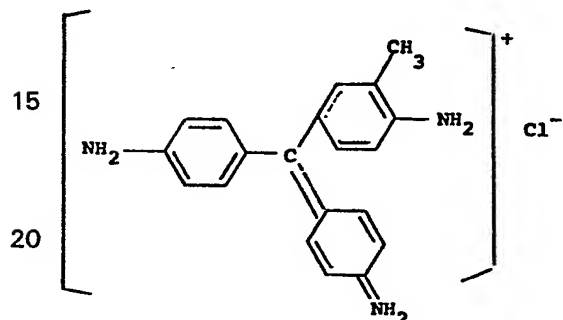


- 65 Triarylmethane dyes are those containing the group 65



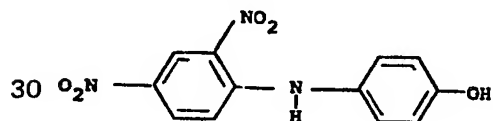
10 and a particular example is Basic Violet 14, of formula

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25 Disperse dyes are those which are substantially insoluble in water and are used as a dispersion in the medium. A particular example is Disperse Yellow 1 of formula

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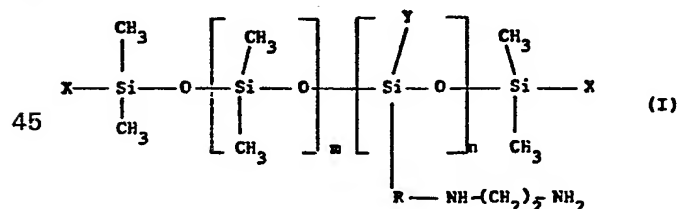


The cationic surfactants for use in the composition of the invention include: quarternised cellulose derivatives, polypropoxylated dialkyl ammonium chloride, quarternised silicone derivatives, diamino functional silicones, polyhalide salts of polyionenes terminated with triethanolammonium groups, quarternised derivatives of gluconic acid, and quaternary oleyl amine esters.

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Preferably the cationic surfactant is a quarternised silicone derivative, diamino functional silicone or a polypropoxylated dialkyl ammonium chloride. Preferred diamino functional silicones are those of general formula (I)

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50 in which X and Y, which may be the same or different, are each C<sub>1-6</sub> alkyl, preferably y -CH<sub>3</sub>, or -OH, R is C<sub>1-3</sub> alkyl and m and n are each integers of from 1 to 100.

50

A particularly preferred compound of formula (I) is Amodimethicone, manufactured by Dow Corning as DC929 emulsion.

Preferably, the compounds of formula (I) are used in the form of emulsions.

55 The quarternised silicone derivatives may be soluble or insoluble in the liquid vehicle. When insoluble they will preferably be present as emulsions.

55

In a preferred form of the invention the liquid vehicle and the cationic surfactant comprise a conditioner base.

The compositions of the invention may optionally include further surfactants which may be cationic or non-ionic to modify the antistatic, combability and gloss properties of the substrate. Hitherto, it has been found desirable, for consumer appeal, to provide dye compositions which generate some foam during use. However, this can reduce the dyeing efficiency of the composition. We have found that by including in the composition amphoteric surfactants with foam producing ability, there is little or no reduction in dyeing capability. Accordingly, in a further aspect of the present invention, the dye composition of the invention additionally contains an

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amphoteric surfactant. Preferred surfactants are those of the betaine type, such as long chain alkyl betaines or long chain alkyl amido alkyl betaines, and they are preferably present in an amount of from 0.1 to 5% by weight of the composition.

The total cationic surfactant content of the composition of the invention is preferably within the range of 0.1 to 10% by weight of the composition, more preferably 0.1 to 5% by weight, and particularly 0.1 to 3% by weight. 5

The total dye content is preferably in the range 0.01 to 10% by weight of the composition. Suitably the dye, or when a mixture of dyes is used, each dye, may be present in the composition of the invention at from 0.01 to 5% by weight, preferably 0.01 to 3%.

The non-ionic surfactants may be present in the composition of the invention at from 0.1 to 5% by weight of the composition. Total non-ionic surfactant content is preferably in the range of from 0.1 to 10% by weight of the composition. 10

It will be appreciated that in formulating the composition, the skilled man would consider the toxicity of each component and would accordingly use a non-toxic amount of dye, cationic surfactant or any other component. 15

Dye compositions of the invention may also comprise conventional toiletries additives such as thickening and suspending agents, opacifiers, pearlescent agents, sequestrants, colour stabilising agents, perfumes, preservatives, glycols and other dye solubilisers.

The pH of the compositions of the invention may be from 1 to 10 preferably from 5 to 7. If necessary the pH may be adjusted using conventional agents. 20

When used herein the term 'liquid vehicle' includes water or water admixed with other non-aqueous liquids which together can dissolve or support the direct dye and cationic surfactant.

In a further aspect the present invention provides a process for the preparation of a dye composition, which comprises:-

(a) optionally dissolving thickeners in a liquid vehicle, heating if necessary to between 30°C and 90°C to effect dissolution; 25

(b) admixing a cationic surfactant with the liquid vehicle at ambient or slightly elevated temperature;

(c) admixing a direct dye with the liquid vehicle;

(d) and adjusting the pH of the composition to within the range of from 4 to 10, preferably from 5 to 7. 30

Further toiletries additives may be added at any convenient stage in the process, preferably before final pH adjustment.

The direct dye may be in dry powder form or may be predispersed, suspended or dissolved in a suitable solvent, preferably a glycol for example glycerin or propylene glycol. 35

The invention further provides a method for treating non-human or human hair comprising applying an effective, non-toxic amount of composition as hereinbefore defined to the hair.

The compositions of the invention will now be illustrated by way of the following Examples.

40	<i>Example 1</i>	<i>Weight Percent</i>	40
	Hydroxy ethyl cellulose	0.7	
	Oleyl amino-bis-(2-hydroxypropyl-trimethyl ammonium chloride)	0.8	
	Glycerin	4.5	
	2-Nitro-p-phenylene diamine	0.4	
45	Perfume	qs	45
	Preservatives	qs	
	Deionised water	qs to 100	
50	<i>Example 2</i>	<i>Weight Percent</i>	50
	Hydroxy ethyl cellulose	0.7	
	$\gamma$ -Gluconamido propyl dimethyl-2 hydroxy ethyl ammonium chloride	0.2	
	Glycerin	4.5	
55	N <sup>4</sup> -(2-hydroxyethyl)-2-nitro-p-phenylene diamine	0.7	55
	Perfume	qs	
	Preservatives	qs	
	Deionised water	qs to 100	

<i>Example 3</i>		<i>Weight Percent</i>	
	Hydroxy ethyl cellulose	0.7	
5	Poly(dimethyl butenyl ammonium chloride)- $\alpha,\omega$ -bis-(triethanolammonium chloride)	2.0	5
	Glycerin	4.5	
	N <sup>1</sup> ,N <sup>4</sup> ,N <sup>4</sup> ,tris(2-hydroxyethyl)-2-nitro-p-phenylene diamine	0.4	
	Perfume	qs	
10	Preservatives	qs	10
	Deionised water	qs to 100	

<i>Example 4</i>		<i>Weight Percent</i>	
15	Hydroxy propyl guar	0.7	15
	Amino functional polydimethyl siloxane (emulsified with Polyoxyethylene (10) nonyl phenyl ether)	1.0	
	Glycerin	4.5	
	N <sup>4</sup> -(2-hydroxyethyl)-2-nitro-p-phenylene diamine	0.4	
20	4-Nitro-o-phenylene diamine	0.2	20
	Perfume	qs	
	Preservatives	qs	
	Deionised water	qs to 100	

25	<i>Test Procedure</i>		25
	Compositions were evaluated by dyeing hair tresses using the following procedure:		
	Hair tresses were prepared using virgin human hair (lg) bound with waxed twine. The colourant composition (0.5g) was applied evenly to the dampened hair tress and allowed to penetrate for 20 minutes before being rinsed in warm water. Finally the tresses were dried with warm air and		
30	assessed in natural daylight.		30

### Results

	<i>Example</i>	<i>Initial</i>	<i>Final Shade</i>	
35	1	light brown	bright red	35
	2	light brown	deep plum	
	3	light blonde	ash-blue	
	4	dark brown	deep burgundy	

40	CLAIMS		40
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	1. A dye composition for treating hair, comprising a cationic surfactant, a direct dye and a liquid vehicle.		
45	2. A composition according to claim 1, in which the cationic surfactant is selected from quaternised cellulose derivatives, polypropoxylated dialkyl ammonium chloride, quaternised silicone derivatives, diamino functional silicones, polyhalide salts of polyionenes terminated with triethanolammonium groups, quaternised derivatives of gluconic acid, and quaternary oleyl amine esters.		45
50	3. A composition according to claim 1 or claim 2, in which the direct dye is selected from anthraquinone, azo, nitro, basic, triarylmethane or disperse dyes.		50
	4. A composition according to any one of claims 1 to 3, in which the cationic surfactant is present within a range of from 0.1 to 10% by weight of the composition.		
	5. A composition according to any one of claims 1 to 4, in which the total dye content is in the range 0.01 to 10% by weight of the composition.		
55	6. A composition according to any one of claims 1 to 5, additionally comprising a non-ionic surfactant.		55
	7. A composition according to any one of claims 1 to 6 additionally comprising an amphoteric surfactant.		
60	8. A composition according to claim 7 wherein the amphoteric surfactant is present in an amount of from 0.1 to 5% by weight of the composition.		60
	9. A dye composition for treating hair, substantially as hereinbefore described in any one of the Examples.		

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**EUR-CL (EPC):** A61K007/13

**ABSTRACT:**

A dye composition for treating hair contains a cationic surfactant, a direct dye and a liquid vehicle. The colour intensity of the dye is increased by the use of cationic surfactants. Amphoteric surfactants are incorporated to increase foam producing ability without reducing to any great extent the dyeing capability.